

## SEQUENCE LISTING

&lt;110&gt; Curtis, Rory A.J.

<120> 52906, 33408, AND 12189, NOVEL POTASSIUM  
CHANNEL FAMILY MEMBERS AND USES THEREOF

&lt;130&gt; 10448-061001

&lt;150&gt; US 60/209,845

&lt;151&gt; 2000-06-06

&lt;160&gt; 13

&lt;170&gt; FastSEQ for Windows Version 4.0

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&lt;211&gt; 3525

&lt;212&gt; DNA

&lt;213&gt; Homo sapiens

&lt;220&gt;

&lt;221&gt; CDS

&lt;222&gt; (638) ... (3178)

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cac cgg cgc gcc ctg ttc gaa aag cgc aag cgg ctc agc gac tac gcg His Arg Arg Ala Leu Phe Glu Lys Arg Lys Arg Leu Ser Asp Tyr Ala 395 400 405	1855
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Thr Ala Asp Val Asp Ile Ile Leu Ser Ile Pro Met Phe Leu Arg Leu			
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tat ctg att gcc aga gtc atg ctt tta cat agc aaa ctt ttc act gat			2287
Tyr Leu Ile Ala Arg Val Met Leu Leu His Ser Lys Leu Phe Thr Asp			
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acc tcc tct aga agc att gga gca ctt aat aag ata aac ttc aat aca			2335
Thr Ser Ser Arg Ser Ile Gly Ala Leu Asn Lys Ile Asn Phe Asn Thr			
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Arg Phe Val Met Lys Thr Leu Met Thr Ile Cys Pro Gly Thr Val Leu			
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Gly Ile Met Gly Ala Gly Cys Thr Ala Leu Val Val Ala Val Val Ala			
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Arg Lys Leu Glu Leu Thr Lys Ala Glu Lys His Val His Asn Phe Met			
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Met Asp Thr Gln Leu Thr Lys Arg Val Lys Asn Ala Ala Asn Val			
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ctc agg gaa aca tgg cta att tac aaa aat aca aag cta gtg aaa aag			2767
Leu Arg Glu Thr Trp Leu Ile Tyr Lys Asn Thr Lys Leu Val Lys Lys			
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Ile Asp His Ala Lys Val Arg Lys His Gln Arg Lys Phe Leu Gln Ala			
715	720	725	
att cat caa tta aga agt gta aaa atg gag cag agg aaa ctg aat gac			2863
Ile His Gln Leu Arg Ser Val Lys Met Glu Gln Arg Lys Leu Asn Asp			
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Gln Ala Asn Thr Leu Val Asp Leu Ala Lys Thr Gln Asn Ile Met Tyr			

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760	765	770	
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775	780	785	790
gcc ctc cct ggg ctc ata agc cag acc atc agg cag cag cag aga gat Ala Leu Pro Gly Leu Ile Ser Gln Thr Ile Arg Gln Gln Arg Asp			3055
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Arg Gly Phe Phe Pro Glu Gln Pro Pro Pro Pro Arg Ser Ser His			
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100 105 110			
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115 120 125			
Ala Ser Ser Gly Ala Pro Ala Ala Gly Ala Gly Asp Asn Leu Ser Leu			
130 135 140			

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 Ser Ala Leu Arg Gln Gln Tyr Ala Gln Gln Ser Ala Gln Gln Ser Ala  
 195 200 205  
 Ser Ala Ser Gln Tyr His Gln Cys His Ser Leu Gln Pro Ala Ala Ser  
 210 215 220  
 Pro Thr Gly Ser Leu Gly Ser Leu Gly Ser Gly Pro Pro Leu Ser His  
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 His His His Pro His Pro Ala His His Gln His His Gln Pro Gln  
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 Ala Arg Arg Glu Ser Asn Pro Phe Thr Glu Ile Ala Met Ser Ser Cys  
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 Arg Tyr Asn Gly Gly Val Met Arg Pro Leu Ser Asn Leu Ser Ala Ser  
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 Arg Arg Asn Leu His Glu Met Asp Ser Glu Ala Gln Pro Leu Gln Pro  
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 Pro Ala Ser Val Gly Gly Gly Ala Ser Ser Pro Ser Ala Ala  
 305 310 315 320  
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 Ser Lys Pro Glu His Asn Asn Ser Asn Asn Leu Ala Leu Tyr Gly Thr  
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 Met Val Ile Glu Thr Glu Leu Ser Trp Gly Ala Tyr Asp Lys Ala Ser  
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 515 520 525  
 Pro Met Phe Leu Arg Leu Tyr Leu Ile Ala Arg Val Met Leu Leu His  
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 Ser Lys Leu Phe Thr Asp Thr Ser Ser Arg Ser Ile Gly Ala Leu Asn  
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 Cys Pro Gly Thr Val Leu Leu Val Phe Ser Ile Ser Leu Trp Ile Ile  
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 Ala Ala Trp Thr Val Arg Ala Cys Glu Arg Tyr His Asp Gln Gln Asp

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Val Val Ala Val Val Ala Arg Lys Leu Glu Leu Thr Lys Ala Glu Lys		
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His Val His Asn Phe Met Met Asp Thr Gln Leu Thr Lys Arg Val Lys		
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Asn Ala Ala Ala Asn Val Leu Arg Glu Thr Trp Leu Ile Tyr Lys Asn		
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Thr Lys Leu Val Lys Lys Ile Asp His Ala Lys Val Arg Lys His Gln		
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Arg Lys Phe Leu Gln Ala Ile His Gln Leu Arg Ser Val Lys Met Glu		
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Gln Arg Lys Leu Asn Asp Gln Ala Asn Thr Leu Val Asp Leu Ala Lys		
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Glu Asp Phe Glu Lys Arg Ile Val Thr Leu Glu Thr Lys Leu Glu Thr		
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785	790	795
Arg Gln Gln Gln Arg Asp Phe Ile Glu Ala Gln Met Glu Ser Tyr Asp		
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Ser Ser Glu Ser Ser Phe Leu Leu Gly Asn Ala Gln Ile Val Asp Trp	
25 30 35	

cct gta gtt tat agt aat gac ggt ttt tgt aaa ctc tct gga tat cat	439
Pro Val Val Tyr Ser Asn Asp Gly Phe Cys Lys Leu Ser Gly Tyr His	
40 45 50	

cga gct gac gtc atg cag aaa agc agc act tgc agt ttt atg tat ggg	487
Arg Ala Asp Val Met Gln Lys Ser Ser Thr Cys Ser Phe Met Tyr Gly	

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gaa ttg act gac aag aag acc att gag aaa gtc agg caa act ttt gac Glu Leu Thr Asp Lys Lys Thr Ile Glu Lys Val Arg Gln Thr Phe Asp	75	80	85	535
aac tac gaa tca aac tgc ttt gaa gtt ctt ctg tac aag aaa aac aga Asn Tyr Glu Ser Asn Cys Phe Glu Val Leu Leu Tyr Lys Asn Arg	90	95	100	583
acc cct gtt tgg ttt tat atg caa att gca cca ata aga aat gaa cat Thr Pro Val Trp Phe Tyr Met Gln Ile Ala Pro Ile Arg Asn Glu His	105	110	115	631
gaa aag gtg gtc ttg ttc ctg tgt act ttc aag gat att acg ttg ttc Glu Lys Val Val Leu Phe Leu Cys Thr Phe Lys Asp Ile Thr Leu Phe	120	125	130	679
aaa cag cca ata gag gat gat tca aca aaa ggt tgg acg aaa ttt gcc Lys Gln Pro Ile Glu Asp Asp Ser Thr Lys Gly Trp Thr Lys Phe Ala	135	140	145	727
cga ttg aca cgg gct ttg aca aat agc cga agt gtt ttg cag cag ctc Arg Leu Thr Arg Ala Leu Thr Asn Ser Arg Ser Val Leu Gln Gln Leu	155	160	165	775
acg cca atg aat aaa aca gag gtg gtc cat aaa cat tca aga cta gct Thr Pro Met Asn Lys Thr Glu Val Val His Lys His Ser Arg Leu Ala	170	175	180	823
gaa gtt ctt cag ctg gga tca gat atc ctt cct cag tat aaa caa gaa Glu Val Leu Gln Leu Gly Ser Asp Ile Leu Pro Gln Tyr Lys Gln Glu	185	190	195	871
gcg cca aag acg cca cca cac att att tta cat tat tgt gct ttt aaa Ala Pro Lys Thr Pro Pro His Ile Ile Leu His Tyr Cys Ala Phe Lys	200	205	210	919
act act tgg gat tgg gtg att tta att ctt acc ttc tac acc gcc att Thr Thr Trp Asp Trp Val Ile Leu Ile Leu Thr Phe Tyr Thr Ala Ile	215	220	225	967
atg gtt cct tat aat gtt tcc ttc aaa aca aag cag aac aac ata gcc Met Val Pro Tyr Asn Val Ser Phe Lys Thr Lys Gln Asn Asn Ile Ala	235	240	245	1015
tgg ctg gta ctg gat agt gtg gtg gac gtt att ttt ctg gtt gac atc Trp Leu Val Leu Asp Ser Val Val Asp Val Ile Phe Leu Val Asp Ile	250	255	260	1063
gtt tta aat ttt cac acg act ttc gtg ggg ccc ggt gga gag gtc att Val Leu Asn Phe His Thr Thr Phe Val Gly Pro Gly Gly Glu Val Ile	265	270	275	1111
tct gac cct aag ctc ata agg atg aac tat ctg aaa act tgg ttt gtg Ser Asp Pro Lys Leu Ile Arg Met Asn Tyr Leu Lys Thr Trp Phe Val	280	285	290	1159

atc gat ctg ctg tct tgt tta cct tat gac atc atc aat gcc ttt gaa Ile Asp Leu Leu Ser Cys Leu Pro Tyr Asp Ile Ile Asn Ala Phe Glu 295 300 305 310	1207
aat gtg gat gag gga atc agc agt ctc ttc agt tct tta aaa gtg gtg Asn Val Asp Glu Gly Ile Ser Ser Leu Phe Ser Ser Leu Lys Val Val 315 320 325	1255
cgt ctc tta cga ctg ggc cgt gtg gct agg aaa ctg gac cat tac cta Arg Leu Leu Arg Leu Gly Arg Val Ala Arg Lys Leu Asp His Tyr Leu 330 335 340	1303
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D	cag gat gat gag gtg gtg gct att tta ggg aag ggt gat gta ttt gga Gln Asp Asp Glu Val Val Ala Ile Leu Gly Lys Gly Asp Val Phe Gly 600 605 610	2119
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E	cg <sup>g</sup> gca ctg acg tac tgt gac cta cac atc atc aag cg <sup>g</sup> gaa gcc ttg Arg Ala Leu Thr Tyr Cys Asp Leu His Ile Ile Lys Arg Glu Ala Leu 635 640 645	2215
N	ctc aaa gtc ctg gac ttt tat aca gct ttt gca aac tcc ttc tca agg Leu Lys Val Leu Asp Phe Tyr Thr Ala Phe Ala Asn Ser Phe Ser Arg 650 655 660	2263
W	aat ctc act ctt act tgc aat ctg agg aaa cg <sup>g</sup> atc atc ttt cgt aag Asn Leu Thr Leu Thr Cys Asn Leu Arg Lys Arg Ile Ile Phe Arg Lys 665 670 675	2311
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G	cag aag ttc aag cag cag aag gag ctg cgg aat cag ggc tca aca cag Gln Lys Phe Lys Gln Gln Lys Glu Leu Arg Asn Gln Gly Ser Thr Gln 715 720 725	2455
C	ggt gac cct gag agg aac caa ctc cag gta gag agc cg <sup>g</sup> tcc tta cag Gly Asp Pro Glu Arg Asn Gln Leu Gln Val Glu Ser Arg Ser Leu Gln 730 735 740	2503
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Thr Pro Ile Gln Thr Ser Leu Ala Tyr Val Lys Thr Ser Glu Ser Leu			
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Lys Gln Asn Asn Arg Asp Ala Met Glu Leu Lys Pro Asn Gly Gly Ala			
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Asp Gln Lys Cys Leu Lys Val Asn Ser Pro Ile Arg Met Lys Asn Gly			
795	800	805	
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Asn Gly Lys Gly Trp Leu Arg Leu Lys Asn Asn Met Gly Ala His Glu			
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Glu Lys Lys Glu Asp Trp Asn Asn Val Thr Lys Ala Glu Ser Met Gly			
825	830	835	
□ cta ttg tct gag gac ccc aag agc agt gat tca gag aac agt gtg acc			2839
Leu Leu Ser Glu Asp Pro Lys Ser Ser Asp Ser Glu Asn Ser Val Thr			
840	845	850	
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Lys Asn Pro Leu Arg Lys Thr Asp Ser Cys Asp Ser Gly Ile Thr Lys			
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□ agt gac ctt cgt ttg gat aag gct ggg gag gcc cga agt ccg cta gag			2935
Ser Asp Leu Arg Leu Asp Lys Ala Gly Glu Ala Arg Ser Pro Leu Glu			
875	880	885	
□ cac agt ccc atc cag gct gat gcc aag cac ccc ttt tat ccc atc ccc			2983
His Ser Pro Ile Gln Ala Asp Ala Lys His Pro Phe Tyr Pro Ile Pro			
890	895	900	
□ gag cag gcc tta cag acc aca ctg cag gaa gtc aaa cac gaa ctc aaa			3031
Glu Gln Ala Leu Gln Thr Thr Leu Gln Glu Val Lys His Glu Leu Lys			
905	910	915	
□ gag gac atc cag ctg ctc agc tgc aga atg act gcc cta gaa aag cag			3079
Glu Asp Ile Gln Leu Leu Ser Cys Arg Met Thr Ala Leu Glu Lys Gln			
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Val Ala Glu Ile Leu Lys Ile Leu Ser Glu Lys Ser Val Pro Gln Ala			
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Ser Ser Pro Lys Ser Gln Met Pro Leu Gln Val Pro Pro Gln Ile Pro			
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Cys Gln Asp Ile Phe Ser Val Ser Arg Pro Glu Ser Pro Glu Ser Asp			

970

975

980

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 985

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 Lys Leu Ser Gly Tyr His Arg Ala Asp Val Met Gln Lys Ser Ser Thr  
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 Cys Ser Phe Met Tyr Gly Glu Leu Thr Asp Lys Lys Thr Ile Glu Lys  
 65 70 75 80  
 Val Arg Gln Thr Phe Asp Asn Tyr Glu Ser Asn Cys Phe Glu Val Leu  
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 Leu Tyr Lys Lys Asn Arg Thr Pro Val Trp Phe Tyr Met Gln Ile Ala  
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 Pro Ile Arg Asn Glu His Glu Lys Val Val Leu Phe Leu Cys Thr Phe  
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 Lys Asp Ile Thr Leu Phe Lys Gln Pro Ile Glu Asp Asp Ser Thr Lys  
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 Gly Trp Thr Lys Phe Ala Arg Leu Thr Arg Ala Leu Thr Asn Ser Arg  
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 Pro Gln Tyr Lys Gln Glu Ala Pro Lys Thr Pro Pro His Ile Ile Leu  
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Lys Leu Asp His Tyr Leu Glu Tyr Gly Ala Ala Val	Leu Val Leu Leu		
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Val Cys Val Phe Gly Leu Val Ala His Trp	Leu Ala Cys Ile Trp Tyr		
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Ser Ile Gly Asp Tyr Glu Val Ile Asp Glu Val	Thr Asn Thr Ile Gln		
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385		390	395
Arg Tyr Asn Thr Ser Ala Gly Ile Trp	Glu Gly Gly Pro Ser Lys Asp		
405		410	415
Ser Leu Tyr Val Ser Ser Leu Tyr Phe	Thr Met Thr Ser Leu Thr Thr		
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Ile Gly Phe Gly Asn Ile Ala Pro	Thr Thr Asp Val Glu Lys Met Phe		
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Gly Asn Val Thr Thr Ile Phe Gln Gln Met	Tyr Ala Asn Thr Asn Arg		
465		470	475
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Val Pro Lys Gly Leu Ser Glu Arg Val Met	Asp Tyr Ile Val Ser Thr		
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Trp Ser Met Ser Lys Gly Ile Asp	Thr Glu Lys Val Leu Ser Ile Cys		
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Pro Lys Asp Met Arg Ala Asp Ile Cys	Val His Leu Asn Arg Lys Val		
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Phe Asn Glu His Pro Ala Phe Arg	Leu Ala Ser Asp Gly Cys Leu Arg		
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Ile Lys Arg Glu Ala Leu Leu Lys Val	Leu Asp Phe Tyr Thr Ala Phe		
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Pro Val Arg Lys Leu Phe Gln Lys Phe	Gln Gln Lys Glu Leu Arg		
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Glu Ser Arg Ser Leu Gln Asn Gly	Thr Ser Ile Thr Gly Thr Ser Val		
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Val Thr Val Ser Gln Ile Thr Pro	Ile Gln Thr Ser Leu Ala Tyr Val		
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cgg gcg cgc acg ctg ggc cg<sup>c</sup> ttc ccg gac act ctg cta ggg gac cca  
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Ala Arg Arg Gly Arg Phe Tyr Asp Asp Ala Arg Arg Glu Tyr Phe Phe  
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      50           55           60

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ggt ggg cgg ctg cgg cg<sup>g</sup> ccg gcg cac gtg ccg ctc gac gtc ttc ctg  
 Gly Gly Arg Leu Arg Arg Pro Ala His Val Pro Leu Asp Val Phe Leu

65	70	75	80	
gaa gag gtg gcc ttc tac ggg ctg ggc gcg gcg gcc ctg gca cgc ctg Glu Glu Val Ala Phe Tyr Gly Leu Gly Ala Ala Ala Leu Ala Arg Leu				288
85 90 95				
cgc gag gac gag ggc tgc ccg gtg ccg ccc gag cgc ccc ctg ccc cgc Arg Glu Asp Glu Gly Cys Pro Val Pro Pro Glu Arg Pro Leu Pro Arg				336
100 105 110				
cgc gcc ttc gcc cgc cag ctg tgc ctg ctt ttc gag ttt ccc gag agc Arg Ala Phe Ala Arg Gln Leu Cys Leu Leu Phe Glu Pro Glu Ser				384
115 120 125				
tct cag gcc gcg cgc gtg ctc gcc gta gtc tcc gtg ctg gtc atc ctc Ser Gln Ala Ala Arg Val Leu Ala Val Val Ser Val Leu Val Ile Leu				432
130 135 140				
gtc tcc atc gtc gtc ttc tgc ctc gag acg ctg cct gac ttc cgc gac Val Ser Ile Val Val Phe Cys Leu Glu Thr Leu Pro Asp Phe Arg Asp				480
145 150 155 160				
gac cgc gac ggc acg ggg ctt gct gct gca gcc gca gcc ggc cgc ttc Asp Arg Asp Gly Thr Gly Leu Ala Ala Ala Ala Gly Pro Phe				528
165 170 175				
ccc gct ccg ctg aat ggc tcc agc caa atg cct gga aat cca ccc cgc Pro Ala Pro Leu Asn Gly Ser Ser Gln Met Pro Gly Asn Pro Pro Arg				576
180 185 190				
ctg ccc ttc aat gac ccg ttc ttc gtg gtg gag acg ctg tgt att tgt Leu Pro Phe Asn Asp Pro Phe Phe Val Val Glu Thr Leu Cys Ile Cys				624
195 200 205				
tgg ttc tcc ttt gag ctg ctg gta cgc ctc ctg gtc tgt cca agc aag Trp Phe Ser Phe Glu Leu Leu Val Arg Leu Leu Val Cys Pro Ser Lys				672
210 215 220				
gct atc ttc ttc aag aac gtg atg aac ctc atc gat ttt gtg gct atc Ala Ile Phe Phe Lys Asn Val Met Asn Leu Ile Asp Phe Val Ala Ile				720
225 230 235 240				
ctt ccc tac ttt gtg gca ctg ggc acc gag ctg gcc cgg cag cga ggg Leu Pro Tyr Phe Val Ala Leu Gly Thr Glu Leu Ala Arg Gln Arg Gly				768
245 250 255				
gtg ggc cag cag gcc atg tca ctg gcc atc ctg aga gtc atc cga ttg Val Gly Gln Gln Ala Met Ser Leu Ala Ile Leu Arg Val Ile Arg Leu				816
260 265 270				
gtg cgt gtc ttc cgc atc ttc aag ctg tcc cgg cac tca aag ggc ctg Val Arg Val Phe Arg Ile Phe Lys Leu Ser Arg His Ser Lys Gly Leu				864
275 280 285				
caa atc ttg ggc cag acg ctt cgg gcc tcc atg cgt gag ctg ggc ctc Gln Ile Leu Gly Gln Thr Leu Arg Ala Ser Met Arg Glu Leu Gly Leu				912
290 295 300				

ctc atc ttt ttc ctc ttc atc ggt gtg gtc ctc ttt tcc agc gcc gtc Leu Ile Phe Phe Leu Phe Ile Gly Val Val Leu Phe Ser Ser Ala Val 305                   310                   315                   320	960
tac ttt gcc gaa gtt gac cggt gtg gac tcc cat ttc act agc atc cct Tyr Phe Ala Glu Val Asp Arg Val Asp Ser His Phe Thr Ser Ile Pro 325                   330                   335	1008
gag tcc ttc tgg tgg gcg gta gtc acc atg act aca gtt ggc tat gga Glu Ser Phe Trp Trp Ala Val Val Thr Met Thr Thr Val Gly Tyr Gly 340                   345                   350	1056
gac atg gca ccc gtc act gtg ggt ggc aag ata gtg ggc tct ctg tgt Asp Met Ala Pro Val Thr Val Gly Gly Lys Ile Val Gly Ser Leu Cys 355                   360                   365	1104
gcc att gcg ggc gtg ctg act att tcc ctg cca gtg ccc gtc att gtc Ala Ile Ala Gly Val Leu Thr Ile Ser Leu Pro Val Pro Val Ile Val 370                   375                   380	1152
tcc aat ttc agc tac ttt tat cac cgg gag aca gag ggc gaa gag gct Ser Asn Phe Ser Tyr Phe Tyr His Arg Glu Thr Glu Gly Glu Ala 385                   390                   395                   400	1200
ggg atg ttc agc cat gtg gac atg cag cct tgt ggc cca ctg gag ggc Gly Met Phe Ser His Val Asp Met Gln Pro Cys Gly Pro Leu Glu Gly 405                   410                   415	1248
aag gcc aat ggg ggg ctg gtg gac ggg gag gta cct gag cta cca cct Lys Ala Asn Gly Gly Leu Val Asp Gly Glu Val Pro Glu Leu Pro Pro 420                   425                   430	1296
cca ctc tgg gca ccc cca ggg aaa cac ctg gtc acc gaa gtg Pro Leu Trp Ala Pro Pro Gly Lys His Leu Val Thr Glu Val 435                   440                   445	1338
tga	1341
<210> 8	
<211> 446	
<212> PRT	
<213> Homo sapiens	
<400> 8	
Cys Cys Glu Arg Leu Val Leu Asn Val Ala Gly Leu Arg Phe Glu Thr	
1                   5                   10                   15	
Arg Ala Arg Thr Leu Gly Arg Phe Pro Asp Thr Leu Leu Gly Asp Pro	
20                   25                   30	
Ala Arg Arg Gly Arg Phe Tyr Asp Asp Ala Arg Arg Glu Tyr Phe Phe	
35                   40                   45	
Asp Arg His Arg Pro Ser Phe Asp Ala Val Leu Tyr Tyr Tyr Gln Ser	
50                   55                   60	
Gly Gly Arg Leu Arg Arg Pro Ala His Val Pro Leu Asp Val Phe Leu	
65                   70                   75                   80	
Glu Glu Val Ala Phe Tyr Gly Leu Gly Ala Ala Ala Leu Ala Arg Leu	
85                   90                   95	

Arg Glu Asp Glu Gly Cys Pro Val Pro Pro Glu Arg Pro Leu Pro Arg  
 100 105 110  
 Arg Ala Phe Ala Arg Gln Leu Cys Leu Leu Phe Glu Phe Pro Glu Ser  
 115 120 125  
 Ser Gln Ala Ala Arg Val Leu Ala Val Val Ser Val Leu Val Ile Leu  
 130 135 140  
 Val Ser Ile Val Val Phe Cys Leu Glu Thr Leu Pro Asp Phe Arg Asp  
 145 150 155 160  
 Asp Arg Asp Gly Thr Gly Leu Ala Ala Ala Ala Ala Gly Pro Phe  
 165 170 175  
 Pro Ala Pro Leu Asn Gly Ser Ser Gln Met Pro Gly Asn Pro Pro Arg  
 180 185 190  
 Leu Pro Phe Asn Asp Pro Phe Phe Val Val Glu Thr Leu Cys Ile Cys  
 195 200 205  
 Trp Phe Ser Phe Glu Leu Leu Val Arg Leu Leu Val Cys Pro Ser Lys  
 210 215 220  
 Ala Ile Phe Phe Lys Asn Val Met Asn Leu Ile Asp Phe Val Ala Ile  
 225 230 235 240  
 Leu Pro Tyr Phe Val Ala Leu Gly Thr Glu Leu Ala Arg Gln Arg Gly  
 245 250 255  
 Val Gly Gln Gln Ala Met Ser Leu Ala Ile Leu Arg Val Ile Arg Leu  
 260 265 270  
 Val Arg Val Phe Arg Ile Phe Lys Leu Ser Arg His Ser Lys Gly Leu  
 275 280 285  
 Gln Ile Leu Gly Gln Thr Leu Arg Ala Ser Met Arg Glu Leu Gly Leu  
 290 295 300  
 Leu Ile Phe Phe Leu Phe Ile Gly Val Val Leu Phe Ser Ser Ala Val  
 305 310 315 320  
 Tyr Phe Ala Glu Val Asp Arg Val Asp Ser His Phe Thr Ser Ile Pro  
 325 330 335  
 Glu Ser Phe Trp Trp Ala Val Val Thr Met Thr Thr Val Gly Tyr Gly  
 340 345 350  
 Asp Met Ala Pro Val Thr Val Gly Gly Lys Ile Val Gly Ser Leu Cys  
 355 360 365  
 Ala Ile Ala Gly Val Leu Thr Ile Ser Leu Pro Val Pro Val Ile Val  
 370 375 380  
 Ser Asn Phe Ser Tyr Phe Tyr His Arg Glu Thr Glu Gly Glu Ala  
 385 390 395 400  
 Gly Met Phe Ser His Val Asp Met Gln Pro Cys Gly Pro Leu Glu Gly  
 405 410 415  
 Lys Ala Asn Gly Gly Leu Val Asp Gly Glu Val Pro Glu Leu Pro Pro  
 420 425 430  
 Pro Leu Trp Ala Pro Pro Gly Lys His Leu Val Thr Glu Val  
 435 440 445

&lt;210&gt; 9

&lt;211&gt; 223

&lt;212&gt; PRT

&lt;213&gt; Artificial Sequence

&lt;220&gt;

&lt;223&gt; consensus sequence

&lt;400&gt; 9

Ile Leu Phe Ile Leu Asp Leu Leu Phe Val Leu Leu Phe Leu Leu Glu  
 1 5 10 15  
 Ile Val Leu Lys Phe Ile Ala Tyr Gly Leu Lys Ser Thr Ser Asn Ile

20	25	30
Ala Ala Lys Tyr Leu Lys Ser Ile Phe Asn Ile Leu Asp Leu Leu Ala		
35	40	45
Ile Leu Pro Leu Leu Leu Leu Val Leu Phe Leu Ser Gly Thr Glu		
50	55	60
Gln Val Ala Lys Lys Arg Leu Arg Glu Arg Phe Ser Leu Glu Leu Ser		
65	70	75
Gln Trp Tyr Tyr Arg Ile Leu Arg Phe Leu Arg Leu Leu Arg Leu Leu		
85	90	95
Arg Leu Leu Arg Leu Leu Arg Leu Leu Arg Arg Leu Glu Thr Leu Phe		
100	105	110
Glu Phe Glu Leu Gly Thr Leu Ala Trp Ser Leu Gln Ser Leu Gly Arg		
115	120	125
Ala Leu Lys Ser Ile Leu Arg Phe Leu Leu Leu Leu Leu Leu Leu Leu		
130	135	140
Ile Gly Phe Ser Val Ile Gly Tyr Leu Leu Phe Lys Gly Tyr Glu Asp		
145	150	155
Leu Ser Glu Asn Glu Val Asp Gly Asn Ser Glu Phe Ser Ser Tyr Phe		
165	170	175
Asp Ala Phe Tyr Phe Leu Phe Val Thr Leu Thr Thr Val Gly Phe Gly		
180	185	190
Asp Leu Val Pro Val Trp Leu Gly Ile Ile Phe Phe Val Leu Phe Phe		
195	200	205
Ile Ile Val Gly Leu Leu Leu Asn Leu Leu Ile Ala Val Ile		
210	215	220

<210> 10  
<211> 120  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> consensus sequence

400	10		
Ala Leu Glu Glu Arg Ser Tyr Pro Ala Gly Glu Val Ile Ile Arg Gln			
1	5	10	15
Gly Asp Pro Gly Asp Ser Phe Tyr Ile Val Leu Ser Gly Glu Val Glu			
20	25	30	
Val Tyr Lys Leu Thr Glu Asp Gly Ala Arg Thr Pro Glu Val Ser Gln			
35	40	45	
Lys Gln Asp Thr Arg Glu Gln Val Val Ala Thr Leu Gly Pro Gly Asp			
50	55	60	
Phe Phe Gly Glu Leu Ala Leu Leu Thr Asn Asp Gly Asn Lys Asn Ala			
65	70	75	80
Val Leu Pro Ser Leu Asp Gln Gly Ala Pro Arg Thr Ala Thr Val Arg			
85	90	95	
Ala Leu Thr Asp Ser Glu Leu Leu Arg Leu Asp Arg Glu Asp Phe Arg			
100	105	110	
Arg Leu Leu Gln Lys Tyr Pro Glu			
115	120		

<210> 11  
<211> 111  
<212> PRT  
<213> Artificial Sequence

&lt;220&gt;

&lt;223&gt; consensus sequence

&lt;400&gt; 11

Glu	Arg	Val	Arg	Leu	Asn	Val	Gly	Gly	Lys	Arg	Phe	Glu	Thr	Ser	Lys
1				5					10						15
Ser	Thr	Leu	Thr	Arg	Phe	Lys	Pro	Asp	Thr	Leu	Leu	Gly	Arg	Leu	Leu
				20					25						30
Lys	Thr	Asp	Ser	Asp	Val	His	Glu	Ala	Arg	Leu	Arg	Leu	Cys	Asp	Phe
						35			40						45
Tyr	Asp	Asp	Glu	Thr	Gly	Glu	Tyr	Phe	Asp	Arg	Ser	Pro	Lys	His	
						50			55						60
Phe	Glu	Thr	Ile	Leu	Asn	Phe	Tyr	Arg	Thr	Gly	Asp	Gly	Lys	Leu	His
65					70				75						80
Arg	Pro	Glu	Val	Cys	Leu	Asp	Ser	Phe	Leu	Glu	Glu	Leu	Glu	Phe	Tyr
						85			90						95
Gly	Leu	Asp	Glu	Leu	Ala	Ile	Glu	Ser	Cys	Cys	Glu	Asp	Glu	Tyr	
						100			105						110

&lt;210&gt; 12

&lt;211&gt; 988

&lt;212&gt; PRT

&lt;213&gt; Rattus norvegicus

&lt;400&gt; 12

Met	Pro	Gly	Gly	Lys	Arg	Gly	Leu	Val	Ala	Pro	Gln	Asn	Thr	Phe	Leu
1				5					10						15
Glu	Asn	Ile	Val	Arg	Arg	Ser	Ser	Glu	Ser	Ser	Phe	Leu	Leu	Gly	Asn
					20				25						30
Ala	Gln	Ile	Val	Asp	Trp	Pro	Val	Val	Tyr	Ser	Asn	Asp	Gly	Phe	Cys
						35			40						45
Lys	Leu	Ser	Gly	Tyr	His	Arg	Ala	Asp	Val	Met	Gln	Lys	Ser	Ser	Thr
						50			55						60
Cys	Ser	Phe	Met	Tyr	Gly	Glu	Leu	Thr	Asp	Lys	Lys	Thr	Ile	Glu	Lys
65						70				75					80
Val	Arg	Gln	Thr	Phe	Asp	Asn	Tyr	Glu	Ser	Asn	Cys	Phe	Glu	Val	Leu
						85			90						95
Leu	Tyr	Lys	Lys	Asn	Arg	Thr	Pro	Val	Trp	Phe	Tyr	Met	Gln	Ile	Ala
						100			105						110
Pro	Ile	Arg	Asn	Glu	His	Glu	Lys	Val	Val	Leu	Phe	Leu	Cys	Thr	Phe
						115			120						125
Lys	Asp	Ile	Thr	Leu	Phe	Lys	Gln	Pro	Ile	Glu	Asp	Asp	Ser	Thr	Lys
						130			135						140
Gly	Trp	Thr	Lys	Phe	Ala	Arg	Leu	Thr	Arg	Ala	Leu	Thr	Asn	Ser	Arg
145						150				155					160
Ser	Val	Leu	Gln	Gln	Leu	Thr	Pro	Met	Asn	Lys	Thr	Glu	Thr	Val	His
						165			170						175
Lys	His	Ser	Arg	Leu	Ala	Glu	Val	Leu	Gln	Leu	Gly	Ser	Asp	Ile	Leu
						180			185						190
Pro	Gln	Tyr	Lys	Gln	Glu	Ala	Pro	Lys	Thr	Pro	Pro	His	Ile	Ile	Leu
						195			200						205
His	Tyr	Cys	Ala	Phe	Lys	Thr	Thr	Trp	Asp	Trp	Val	Ile	Leu	Ile	Leu
						210			215						220
Thr	Phe	Tyr	Thr	Ala	Ile	Met	Val	Pro	Tyr	Asn	Val	Ser	Phe	Lys	Thr
225						225			230						240
Lys	Gln	Asn	Asn	Ile	Ala	Trp	Leu	Val	Leu	Asp	Ser	Val	Val	Asp	Val
						245			250						255

Ile Phe Leu Val Asp Ile Val Leu Asn Phe His Thr Thr Phe Val Gly  
 260 265 270  
 Pro Gly Gly Glu Val Ile Ser Asp Pro Lys Leu Ile Arg Met Asn Tyr  
 275 280 285  
 Leu Lys Thr Trp Phe Val Ile Asp Leu Leu Ser Cys Leu Pro Tyr Asp  
 290 295 300  
 Ile Ile Asn Ala Phe Glu Asn Val Asp Glu Gly Ile Ser Ser Leu Phe  
 305 310 315 320  
 Ser Ser Leu Lys Val Val Arg Leu Leu Arg Leu Gly Arg Val Ala Arg  
 325 330 335  
 Lys Leu Asp His Tyr Leu Glu Tyr Gly Ala Ala Val Leu Val Leu Leu  
 340 345 350  
 Val Cys Val Phe Gly Leu Val Ala His Trp Leu Ala Cys Ile Trp Tyr  
 355 360 365  
 Ser Ile Gly Asp Tyr Glu Val Ile Asp Glu Val Thr Asn Thr Ile Gln  
 370 375 380  
 Ile Asp Ser Trp Leu Tyr Gln Leu Ala Leu Ser Ile Arg Thr Pro Tyr  
 385 390 395 400  
 Arg Tyr Asn Thr Ser Ala Gly Ile Trp Glu Gly Gly Pro Ser Lys Asp  
 405 410 415  
 Ser Leu Tyr Val Ser Ser Leu Tyr Phe Thr Met Thr Ser Leu Thr Thr  
 420 425 430  
 Ile Gly Phe Gly Asn Ile Ala Pro Thr Thr Asp Val Glu Lys Met Phe  
 435 440 445  
 Ser Val Ala Met Met Met Val Gly Ser Leu Leu Tyr Ala Thr Ile Phe  
 450 455 460  
 Gly Asn Val Thr Thr Ile Phe Gln Gln Met Tyr Ala Asn Thr Asn Arg  
 465 470 475 480  
 Tyr His Glu Met Leu Asn Asn Val Arg Asp Phe Leu Lys Leu Tyr Gln  
 485 490 495  
 Val Pro Lys Gly Leu Ser Glu Arg Val Met Asp Tyr Ile Val Ser Thr  
 500 505 510  
 Trp Ser Met Ser Lys Gly Ile Asp Thr Glu Lys Val Leu Ser Ile Cys  
 515 520 525  
 Pro Lys Asp Met Arg Ala Asp Ile Cys Val His Leu Asn Arg Lys Val  
 530 535 540  
 Phe Asn Glu His Pro Ala Phe Arg Leu Ala Ser Asp Gly Cys Leu Arg  
 545 550 555 560  
 Ala Leu Ala Val Glu Phe Gln Thr Ile His Cys Ala Pro Gly Asp Leu  
 565 570 575  
 Ile Tyr His Ala Gly Glu Ser Val Asp Ala Leu Cys Phe Val Val Ser  
 580 585 590  
 Gly Ser Leu Glu Val Ile Gln Asp Glu Glu Val Val Ala Ile Leu Gly  
 595 600 605  
 Lys Gly Asp Val Phe Gly Asp Ile Phe Trp Lys Glu Thr Thr Leu Ala  
 610 615 620  
 His Ala Cys Ala Asn Val Arg Ala Leu Thr Tyr Cys Asp Leu His Ile  
 625 630 635 640  
 Ile Lys Arg Glu Ala Leu Leu Lys Val Leu Asp Phe Tyr Thr Ala Phe  
 645 650 655  
 Ala Asn Ser Phe Ser Arg Asn Leu Thr Leu Thr Cys Asn Leu Arg Lys  
 660 665 670  
 Arg Ile Ile Phe Arg Lys Ile Ser Asp Val Lys Lys Glu Glu Glu  
 675 680 685  
 Arg Leu Arg Gln Lys Asn Glu Val Thr Leu Ser Ile Pro Val Asp His  
 690 695 700  
 Pro Val Arg Lys Leu Phe Gln Lys Phe Lys Gln Gln Lys Glu Leu Arg

705	710	715	720	
Asn Gln Gly Ser Ala Gln Ser Asp Pro Glu Arg Ser Gln Leu Gln Val				
	725	730	735	
Glu Ser Arg Pro Leu Gln Asn Gly Ala Ser Ile Thr Gly Thr Ser Val				
	740	745	750	
Val Thr Val Ser Gln Ile Thr Pro Ile Gln Thr Ser Leu Ala Tyr Val				
	755	760	765	
Lys Thr Ser Glu Thr Leu Lys Gln Asn Asn Arg Asp Ala Met Glu Leu				
	770	775	780	
Lys Pro Asn Gly Gly Ala Glu Pro Lys Cys Leu Lys Val Asn Ser Pro				
	785	790	795	800
Ile Arg Met Lys Asn Gly Asn Gly Lys Gly Trp Leu Arg Leu Lys Asn				
	805	810	815	
Asn Met Gly Ala His Glu Glu Lys Lys Glu Glu Trp Asn Asn Val Thr				
	820	825	830	
Lys Ala Glu Ser Met Gly Leu Leu Ser Glu Asp Pro Lys Gly Ser Asp				
	835	840	845	
Ser Glu Asn Ser Val Thr Lys Asn Pro Leu Arg Lys Thr Asp Ser Cys				
	850	855	860	
Asp Ser Gly Ile Thr Lys Ser Asp Leu Arg Leu Asp Lys Ala Gly Glu				
	865	870	875	880
Ala Arg Ser Pro Leu Glu His Ser Pro Ser Gln Ala Asp Ala Lys His				
	885	890	895	
Pro Phe Tyr Pro Ile Pro Glu Gln Ala Leu Gln Thr Thr Leu Gln Glu				
	900	905	910	
Val Lys His Glu Leu Lys Glu Asp Ile Gln Leu Leu Ser Cys Arg Met				
	915	920	925	
Thr Ala Leu Glu Lys Gln Val Ala Glu Ile Leu Lys Leu Leu Ser Glu				
	930	935	940	
Lys Ser Val Pro Gln Thr Ser Ser Pro Lys Pro Gln Ile Pro Leu Gln				
	945	950	955	960
Val Pro Pro Gln Ile Pro Cys Gln Asp Ile Phe Ser Val Ser Arg Pro				
	965	970	975	
Glu Ser Pro Glu Ser Asp Lys Asp Glu Ile Asn Phe				
	980	985		

```
<210> 13  
<211> 532  
<212> PRT  
<213> Mus musculus
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<400> 13
Met Thr Thr Arg Lys Ala Gln Glu Ile His Gly Lys Ala Pro Gly Gly
      1          5           10          15
Ser Val Ser Thr Gly Val Gly Thr Ala Glu Gly Ala Pro Ser Pro Ala
      20          25           30
Gly Val Thr Pro Pro Pro Pro Arg Pro Gly Arg Thr Phe His Ala
      35          40           45
Ile Phe Thr Arg Arg His Arg Thr Pro Asp Trp Gly Gly Cys Gly Val
      50          55           60
Gly Ala Thr Arg Pro Phe Thr Gly Arg Pro Gly Cys Ala Arg His Gly
      65          70           75           80
Ala Thr Val Pro Ala Ala Leu Arg Cys Cys Glu Arg Leu Val Leu Asn
      85          90           95
Val Ala Gly Leu Arg Phe Glu Thr Arg Ala Arg Thr Leu Gly Arg Phe
      100         105          110
Pro Asp Thr Leu Leu Gly Asp Pro Val Arg Arg Ser Arg Phe Tyr Asp

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115	120	125
Gly Ala Arg Ala Glu Tyr Phe Phe Asp Arg His		Arg Pro Ser Phe Asp
130	135	140
Ala Val Leu Tyr Tyr Gln Ser Gly Gly Arg		Leu Arg Arg Pro Ala
145	150	155
His Val Pro Leu Asp Val Phe Leu Glu Glu Val Ser Phe Tyr		Gly Leu
165	170	175
Gly Arg Arg Leu Ala Arg Leu Arg Glu Asp Glu Gly Cys		Ala Val Ala
180	185	190
Glu Arg Pro Leu Pro Pro Pro Phe Ala Arg Gln		Leu Trp Leu Leu Phe
195	200	205
Glu Phe Pro Glu Ser Ser Gln Ala Ala Arg Val		Leu Ala Val Val Ser
210	215	220
Val Leu Val Ile Leu Val Ser Ile Val Val Phe Cys		Leu Glu Thr Leu
225	230	235
Pro Asp Phe Arg Asp Asp Arg Asp Pro Gly		Leu Ala Pro Val Ala
245	250	255
Ala Ala Thr Gly Ser Phe Leu Ala Arg Leu Asn Gly		Ser Ser Pro Met
260	265	270
Pro Gly Ala Pro Pro Arg Gln Pro Phe Asn Asp		Pro Phe Val Val
275	280	285
Glu Thr Leu Cys Ile Cys Trp Phe Ser Phe Glu		Leu Leu Val His Leu
290	295	300
Val Ala Cys Pro Ser Lys Ala Val Phe Phe Lys		Asn Val Met Asn Leu
305	310	315
Ile Asp Phe Val Ala Ile Leu Pro Tyr Phe Val		Ala Leu Gly Thr Glu
325	330	335
Leu Ala Arg Gln Arg Gly Val Gly Gln Pro Ala		Met Ser Leu Ala Ile
340	345	350
Leu Arg Val Ile Arg Leu Val Arg Val Phe Arg		Ile Phe Lys Leu Ser
355	360	365
Arg His Ser Lys Gly Leu Gln Ile Leu Gly Gln		Thr Leu Arg Ala Ser
370	375	380
Met Arg Glu Leu Gly Leu Leu Ile Phe Phe Leu		Phe Ile Gly Val Val
385	390	395
Leu Phe Ser Ser Ala Val Tyr Phe Ala Glu Val		Asp Arg Val Asp Thr
405	410	415
His Phe Thr Ser Ile Pro Glu Ser Phe Trp Trp		Ala Val Val Thr Met
420	425	430
Thr Thr Val Gly Tyr Gly Asp Met Ala Pro Val		Thr Val Gly Gly Lys
435	440	445
Ile Val Gly Ser Leu Cys Ala Ile Ala Gly Val		Leu Thr Ile Ser Leu
450	455	460
Pro Val Pro Val Ile Val Ser Asn Phe Ser		Tyr Phe Tyr His Arg Glu
465	470	475
Thr Glu Gly Glu Ala Gly Met Tyr Ser His Val		Asp Thr Gln Pro
485	490	495
Cys Gly Thr Leu Glu Gly Lys Ala Asn Gly		Gly Leu Val Asp Ser Glu
500	505	510
Val Pro Glu Leu Leu Pro Pro Leu Trp Pro Pro		Ala Gly Lys His Met
515	520	525
Val Thr Glu Val		
530		